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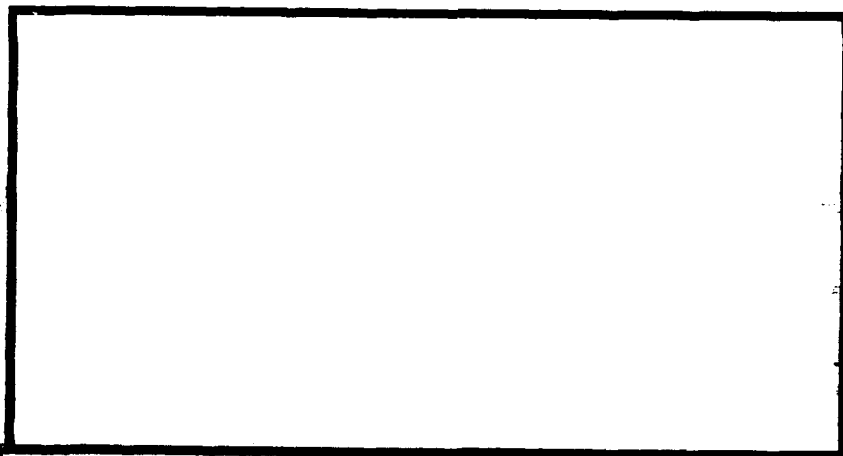
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AN ANALYSIS OF BASE LEVEL
ENVIRONMENTAL ORGANIZATIONS

THESIS

John F. Akers Jr., Captain, USAF

AFIT/GEM/DEV/91S-1

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AN ANALYSIS OF BASE LEVEL ENVIRONMENTAL ORGANIZATIONS

THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Engineering Management

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Captain, USAF

September 1991

Approved for public release; distribution unlimited

Preface

The purpose of this thesis was to try and determine if there was one type of environmental organization which was truly so much more effective than the others that all bases should have it, or if the decision of which type of environmental organization to have should be left entirely to the bases. In addition, I hoped to discover the advantages and disadvantages of each type of organizational structure. I feel that knowing these advantages and disadvantages will greatly aid those individuals making the decisions on environmental organizational structure. In completing this study I turned to the only place the answers to these questions could exist, with the base level environmental leaders, managers, and engineers. From their input I learned that, across the Air Force, environmental management is changing rapidly.

In completing this thesis I would like to thank my thesis advisors, Major William Burcher and Lt Col Mark Goltz for their time and patience. I would also like to thank my fellow engineering management students for their comments on my survey and all of the help they have provided to me throughout this program. A special thanks is due to the environmental leaders, managers, and engineers who took time out of their busy schedules to fill out my survey, especially those who took the time to write comments; many of which I used in this thesis. But mostly I want to pay a special tribute to my wife Patti for her endurance, patience, and love in seeing me through this thesis, and to my son Evan for reminding me of what is really important.

John F. Akers Jr.

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1. The Three Typical Organizational Structures	3

Abstract

The purpose of this thesis was to determine the best design for base-level environmental organizations. Environmental management offices, and civil engineering branch and section level environmental organizations were considered. The study tried to determine the reasons why bases have changed their environmental organizations, and if the Air Force should develop a standard type of environmental organization. Determining if one environmental organization was more effective than the other types, and the factors that are important in determining the type of organization, were also examined. A literature review found two studies which addressed a portion of this subject. In this study, a survey was sent to 443 Air Force officers and civilians, who are involved in environmental management. The survey results did not reveal one specific reason why bases had changed the type of their environmental organization. The thesis concluded that the Air Force should not develop a standard type of environmental organization, but leave this decision up to the bases. In general, one type of environmental organization was not found to be more effective than another. The most important factors to use in determining type of environmental organization were summarized to provide guidance to decision makers.

AN ANALYSIS OF BASE LEVEL ENVIRONMENTAL ORGANIZATIONS

I. Introduction

General Issue

Environmental issues first came to the forefront in the late 1960's and early 1970's resulting in the passage of many new environmental laws. The recent celebration of the 20th anniversary of Earth Day brought environmental problems back into the public interest. With the current national emphasis on environmental problems; many environmental managers are looking to improve management, in general, as a way to help solve both current and future environmental problems (as well as dealing with the new rounds of environmental legislation this renewed emphasis may bring) (7:408-409). In their article on the environmental infrastructure Bates and Shelton list improving management as part of the solution to deal with current infrastructure problems and needs (3:24).

In the Department of Defense (DoD) there is a growing commitment towards environmental quality and compliance. As of 1988, DoD had more than 5,000 people working environmental programs as well as a budget of more than \$1 billion for environmental management (24:22). Defense 90 quoted Secretary of Defense Dick Cheney's policy memorandum issued on 10 October 1989 that stated:

As the largest federal agency, the Department of Defense has a great responsibility to meet this (environmental) challenge.... I want every command to be an environmental standard by which federal agencies are judged. (24:22)

The Air Force's renewed commitment to environmental quality is evidenced by new programs such as the Environmental Leadership Conference Series (34:1), the redesignation of the Air Force Regional Civil Engineering offices to Air Force Regional Environmental Offices (26:1), and the creation of the Center for Environmental Excellence at Brooks AFB (29).

Almost all environmental legislation affects the Air Force in some way. All Air Force bases have, at a minimum, one to two people working in the environmental management area. To deal with the ever-increasing environmental laws and regulations, and to meet the challenges set forth by DoD leadership, excellent management of the environmental function is becoming a necessity.

Specific Problem

One of the problems currently facing environmental managers is the issue of the placement of their environmental organization within the base organizational structure. Traditionally, local installation commanders have the option of leaving the environmental organization under the base civil engineer at the branch, or section level; or creating a separate environmental management office (11:31). Currently, the organizational level of many base level environmental management functions is changing from reporting to the base civil engineer, to reporting to the base or wing commander (6). Figure 1 shows the three most common placements of the environmental organization found across the Air Force. The placement of the environmental organization will have an impact on the internal make-up of the organization.

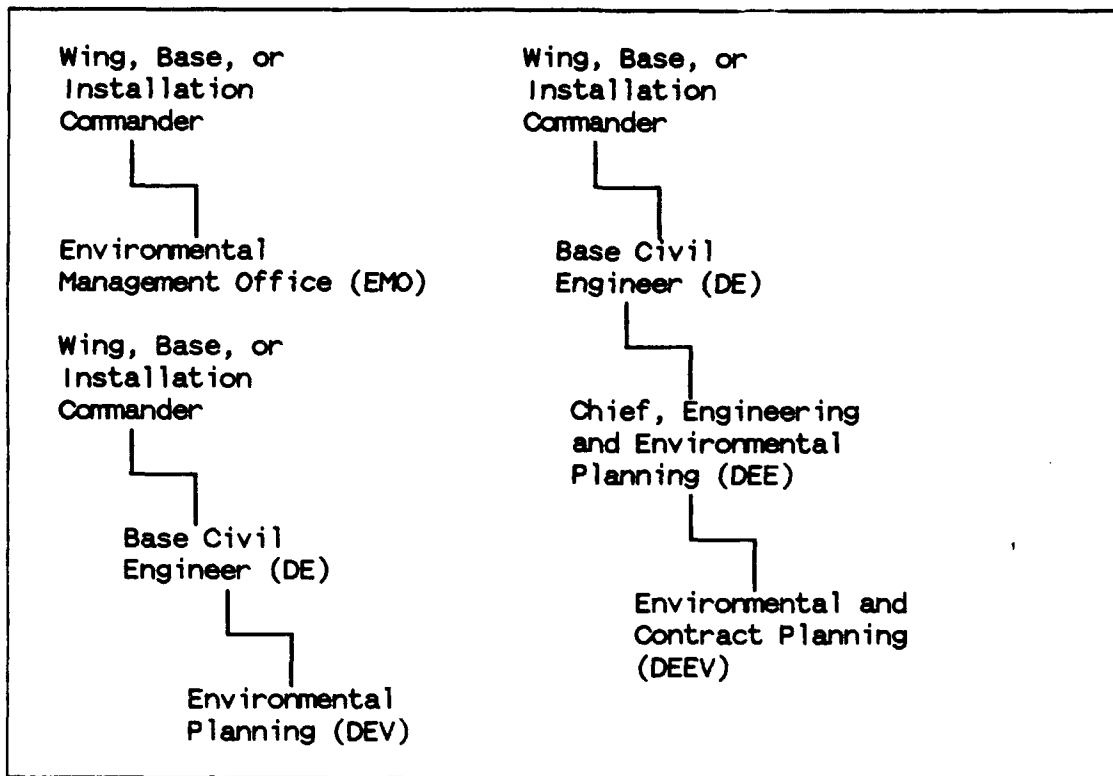


Figure 1. The Three Typical Organizational Structures

To some degree, the decision on placement of the environmental organization affects the type of work that will go on within the organization. Environmental management organizations working for a base or wing commander are generally able to concentrate themselves strictly with environmental functions, and have a wide variety of environmental specialists combined in one office. Chapter II reviews two studies which make arguments for an organization similar to an environmental management office. On the other hand, an environmental management function at the lowest level of a base civil engineering organization may also have to perform the community and contract planning functions and rely on other organizations for support in working the environmental issues. In this research the term "type", as

in type of environmental organization, will refer to both the placement of the environmental organization and its internal structure.

Research Question

In order to deal with future environmental problems, the environmental management function has to be in a position where it can be most effective. What is the best organizational design for the environmental organization?

Investigative Questions

In order to answer the broader research question several investigative questions must be answered.

1. Why, in the past, have bases changed the type of their environmental organization?
2. Should the Air Force adopt a standard type of environmental organization or should the decision be left up to the bases or major commands?
3. Is one type of environmental organization more effective than another?
4. What factors should be considered when determining the type of environmental organization for a particular base?
5. What type of environmental management functions do the other services and civilian corporations have and how effective do they feel their environmental management functions are?

Definitions

The following definitions will be used throughout this research:

Environmental Organization - The base level function performing the base's environmental management tasks, either as a separate environmental management office or at the branch or section level within the base civil engineering organization.

Effectiveness - The degree to which an organization is able to accomplish its mission.

Environmental Programs - The base's plans, policies, and day-to-day activities designed to comply with current environmental laws and regulations.

Environmental Leadership - Those individuals on the base specifically designated to make policy and day-to-day decisions on the base's environmental programs. Specifically they include the base's environmental protection committee chairman, the base civil engineer, and the chief of the environmental organization.

In addition to these definitions Air Force Manpower Standard 4423 provides the latest listing of the responsibilities of the environmental management function. The majority of these duties include: Collecting pollution data; evaluating on-base pollutant generation sources; managing environmental compliance assessment and management program; monitoring the installations solid waste, hazardous, non-hazardous waste, air quality, water quality, environmental impact analysis, and installation restoration remedial response programs; preparing and maintaining pollution permits and environmental plans and regulations; and participating in spill response. In addition, many bases have the community and natural

resources planning as part of the environmental management function (10:4-7).

Scope and Limitations

This research compares base and major command perceptions of effectiveness and background behind changes in environmental organizations, and their perceptions about the varying types of base level environmental organizations. The research will concentrate on the base and major command Air Force leaders who make decisions on base and major command level policy, as well as those Air Force managers who work the day-to-day environmental issues at both the base and the major command level. Additionally, information on the environmental programs of other services and civilian corporations will be gathered for comparison purposes.

The research is limited to comparing three distinct types of environment organizations: the environmental management office, the organizations at branch level within civil engineering, and the organizations at section level within civil engineering. When trying to compare the effectiveness of the different types of environmental organizations, the research is limited by the difficulties associated with measuring effectiveness in a service organization which does not produce bottom line figures such as profit and return on investment. The research does not examine the effects that relocating the environmental organization may have on other base organizations

The research will exclude overseas (except for Alaska and Hawaii), Air Force Reserve, and Air National Guard bases since their programs can not be directly compared to active duty continental United States

bases. Additionally, the research does not evaluate the structure of the environmental functions at major command and air staff levels.

II. Literature Review

Background

As part of the research on environmental organizations several general management topics were reviewed as well as the literature on the placement of environmental organizations. Literature supporting the assumption that environmental problems are increasing was also reviewed.

Management Issues

Organizing. One of the most current theories concerning organizing is contingency theory. Contingency theory is a situational approach to organizing, in that the organizational structure corresponds to the current situation of the organization. Contingency theory also advocates that organizational structure should be designed on the basis of organizational effectiveness (33). To some degree this research will test this theory.

Organizational Structure and Effectiveness. As part of their model of organizational effectiveness or productivity several authors include organizational design in some form.

Sutcliffe includes Formal Organization, which is influenced by Structure, as a major factor affecting productivity (35). In his total spectrum model of human and organizational effectiveness, Secrist includes Organizational Structure as one of five factors influencing organizational climate which operates on the organization's personnel influencing overall organizational effectiveness (30).

These models support the idea that organizational structure can be an important contributing factor in organizational effectiveness. However, in Organizations, Gibson, Ivancevich, and Donnelly acknowledge that organizational structure affects the behavior of groups. They also state that organizational structures may not contribute positively to organizational performance. To assume that organizational structure will contribute positively to organizational performance assumes that the manager can match organizational structure and goals (15:288). From this we can conclude that organizational structure has some role to play in the effectiveness of organizations.

Measuring Effectiveness. There are several approaches and plans for measuring effectiveness, particularly effectiveness in service organizations. These include the goals approach, systems theory, and constituency groups. In Organizations, Gibson, Ivancevich, and Donnelly outline the goals approach and systems theory.

The premise behind the goals approach is that organizations are established to accomplish goals and the degree to which these goals are achieved is a measure of effectiveness. However, with this simplistic approach there are several problems. Some of the problems include: goal achievement is difficult to measure in organizations that do not produce a tangible output, attempts to achieve one goal may preclude or reduce the ability to achieve others, and difficulties obtaining a consensus as to the specific goals of the organization.

Systems theory describes the behavior of an organization both internally and externally. In simple terms the organization takes inputs, in the form of resources, externally from the environment,

processes them internally and returns them in the form of outputs. In the process the organization receives information on how well it is doing in the form of feedback. Under this theory, effectiveness is measured in terms of the input-output cycle and feedback from the environment. Additionally, the concept that certain criteria of organizational effectiveness will be more important over time can also be introduced into this theory (15:26-30).

Similar to systems theory, Steven Coyle, in a masters thesis, used a multiple input-output model to measure the performance of a base's environmental protection program. Coyle's model attempted to quantify input and output measures of a typical service-oriented environmental management organization. The analysis was accomplished by processing the data gathered through a computerized Constrained Facet Analysis model, Productivity Assessment Support System. The results showed that the model could measure performance within certain limits (8:viii). While this model may measure performance well, it lacked the ability to measure organizational effectiveness as defined by this research.

The constituency group approach to organizational effectiveness was developed by Friedlander and Pickle. In their approach, different parties of interest, such as owners, customers, employees, etc., are identified. Each of these parties of interest then rate the effectiveness of the organization to develop a profile of the organization's overall effectiveness (13:289-304).

An extension of the constituency group approach is the stakeholder audit. In their article Roberts and King describe how the audit works

and its recent introduction to the public sector. The steps of a stakeholder audit include: identifying stakeholder in an organization, determining their stake in the organization, assessing how well the organization is meeting their needs, and then adjusting priorities to bring the organization in line with the stakeholder's interests.

Roberts and King state that the stakeholder audit is a useful tool for public sector managers who are often confronted with the politics of management (28:63-66). While it is not truly a measure of effectiveness, the stakeholder audit has many implications for the environmental organization which must satisfy many such stakeholder.

In the absence of bottom line figures such as profit, return on investment, etc., to measure effectiveness, many approaches are being developed and used. The use of one method over another method can depend on how the organization wishes to define its effectiveness.

Environmental Management and Managers

A review of the literature which covers environmental management on a macro scale shows the current state of environmental management and the situations which environmental managers currently face.

Joseph Petulla, in his book Environmental Protection in the United States, examines the systems that govern environmental protection in the U. S. today. Petulla investigates the external dynamics among industry, government agencies and environmental groups and the internal dynamics of environmental organizations where the day-to-day tasks of environmental management are carried out. The author bases his conclusions on surveys and personal interviews with environmental managers in industry and agencies and the newsletters and

magazines of more than 10 environmental groups (25:7-9). Petulla found that the workings of environmental protection have become a process of "... escalating demands as an extremely costly, inefficient way to solve environmental problems." In other words, industry, government agencies, and environmentalists, rather than working together, have developed an adversarial action/reaction relationship. Petulla found that this relationship is not only found in society at large but also at the community and work place level. Petulla states that the key to successful environmental management lies in integrating the power of all of these groups' (industry, government agencies, and environmentalists) environmental managers to set common goals and standards for the future and pool their resources to achieve them (25:187-188).

In the book Beauty, Health, and Permanence, Samuel Hays discusses environmental politics in the United States. Hays reveals that environmental politics do not stop once a new piece of legislation is passed. The administration of the law, which is generally regarded as apolitical, has become very political in the area of environmental law. The controversies which were argued over before and during the passing of the law are argued over again during its administration. Those who wanted the law to achieve an objective hope that administration will advance that objective, while the opponents of the law hope that administration will reduce the impact of the law. In this process the environmental managers become key figures in political controversy (19:5-7).

Getting environmental managers to work together for environmental protection as well as come to grips with the political realities they face is a large part of this research. One of the primary goals in deciding on the proper placement of the environmental organization should be to foster productive working relationships for the base environmental management staff so as to help achieve the goal of environmental protection. Politics, although a part of any decision on the proper organizational placement of the environmental function, should not become too large a part of the decision. Primary consideration should be given to what is best for the installation and the environment. In this case again the environmental manager may become a key figure in a political controversy.

Environmental Organizations

Very little has been written on the placement of environmental organizations.

C. E. Kramer and J. J. Gratton, in their masters thesis, in 1976, took an early look at DoD environmental organizations. Kramer and Gratton found that the Air Force's organizations were well balanced at all levels of command, while the Army's and Navy's were keeping much of the environmental functions at a headquarters level. The authors recommended that both the Army and Navy establish an environmental protection committee, similar to the Air Force's, at all levels of command (21:78-80). One part of this research will be to look at the Army and Navy's present environmental management structure.

In a masters thesis, Daniel Ridder proposed combining several base organizations, including the environmental organization, into a single

resource protection organization. The purpose of the study was to determine how these organizations could be combined and if the consolidation would allow for more effective control over the management of environmental quality, and human health and safety programs. The study found that a single resource protection organization would accomplish three objectives: allowing more flexibility for assigning personnel, "facilitating a higher level of decision making support for environmental compliance matters," and granting the authority to the environmental organization necessary to achieve environmental compliance (27:vii-vii). The formation of a single resource protection branch is beyond the scope of this research; however, this thesis does provide some background on the formation of environmental management offices and offers some support for the use of this type of organization.

In an article entitled "Organizing for Environmental Compliance," Robert Andreoli states that, "Well thought-out placement and organization of the environmental function is critical to achieving compliance and establishing good relationships with regulatory agencies." Andreoli makes the point that determining where the base's decision making authority ultimately rests and assuring access to that authority is the key to placing the environmental organization. Placement which assures adequate access to authority will help convince regulators that the base is serious about environmental compliance. Additionally, the environmental organization must have its own authority which would be an extension of the top management's authority, and control over its own resources. Finally, Andreoli

states that the placement of the environmental organization must be reviewed over time, "in the light of new regulatory trends."

(2:281-287) While Andreoli makes good arguments for his views he does not offer any research to back them up.

Two common threads emerge in both Andreoli's article and Ridder's thesis: access to the base's decision making authority, and granting the environmental organization the necessary authority to achieve environmental compliance. While both authors make arguments which support the use of the environmental management office at base level, neither provides conclusive data to show that this type of environmental organization is more effective than the others currently in use.

The Future of Environmental Management

Identifying Problems. Future environmental problems may not be recognized quickly. In an article on environmental issues in the next century, Charles Gunnerson discusses and provides several examples of the long time frame involved in which environmental problems are caused, recognized and resolved. Failure to recognize environmental issues or neglecting them until they are unavoidable can be found in many areas including industry, transportation, and energy (17:288).

The current array of problems facing the environmental manager is varied and complex. In their article on environmental infrastructure problems, Marcia Bates and Stephen Shelton predict many of our future environmental problems will stem from the need to upgrade our environmental infrastructure, where environmental infrastructure is defined as a wide variety of public services such as water supply,

water and wastewater treatment, air pollution control, and hazardous waste treatment and disposal (3:19).

Water supply needs are defined both quantitatively and qualitatively. With growing populations and uneven distribution of precipitation, especially in the west and southwest, previously unending sources of water are reaching their limits. Other areas of the country with adequate water supplies are finding them increasingly unsuitable due to contamination (3:20). The solution of the problems associated with water supply needs is critical. Gunnerson provides historical examples which lead to the conclusion that an equitable allocation of water supplies provides for political and economic stability (17:293).

Problems with the country's wastewater treatment facilities are often due to the lack of maintenance. Currently many facilities discharge water that does not meet federal clean water standards (3:21). For example, in 1989 the United States General Accounting Office (GAO) reported that 22 percent of DoD waste water treatment facilities were noncompliant with federal clean water standards at least one quarter of fiscal years 1985 and 1986 (14:6:3). The discharge from these facilities often affects the quality of the water supply of downstream towns. Additionally, many facilities are overloaded by the infiltration of ground water into the many times 100-year-old collection systems.

The production of hazardous and industrial wastes has been steadily increasing; however, the technology to contain and treat these wastes has not kept pace. Current technologies like landfills lined

with clay or synthetic liners are often inadequate to contain many industrial wastes. The disposal of many of these wastes by incineration often results in the production of harmful air pollutants (3:21).

Solving Environmental Problems. The solutions to these environmental management problems are as varied and complex as the problems themselves. Bates and Shelton state that the development of solutions will involve several key interrelated components including: prioritization, funding, and management (3:21).

Because the need to solve environmental problems outweighs the available resources, prioritization will be the key for solving environmental problems. To successfully prioritize, all needs have to be lowered to their most basic level and then compared equally to generate priorities (3:22). Traditionally priorities of environmental compliance problems within DoD have been low. In 1989 the GAO reported that environmental compliance must often compete with the mission goals (14:6).

The funding for solving environmental problems is national in scope and is going to require commitments from all levels of government (3:22). Environmental research activities have always lacked funding. In his article on Department of Defense (DoD) environmental initiatives, Alvin Alm suggests that much of the DoD's technical research and development can be used successfully in the area of solutions to environmental problems. Alm believes that the DoD initiatives may, in the long run, be able to provide the needed technology to solve complex environmental problems (1:1295). Bates

and Shelton suggest that the privatization of many of our environmental infrastructure facilities may offer a solution to the lack of funding. Under this plan, private companies would purchase or contract to operate infrastructure facilities. This is an attractive option to many municipalities who can not raise enough capital to construct or operate these facilities (3:23). Within DoD funding problems are often linked to the delays caused by the federal budget and procurement process delays (14:4).

Bates and Shelton also make the point that proper management is the key to dealing with prioritization and funding issues. Good managers should develop expertise in all areas of management as well as be able to provide convincing arguments for funding maintenance, repair, and construction of environmental infrastructure facilities (3:24).

Summary. The environmental manager of today and tomorrow will face a great many challenges. Because the time lag from the cause of environmental problems to their identification is long, it will always be difficult for the environmental manager to plan for the future. For the foreseeable future the deteriorating environmental infrastructure will be a continuing source of environmental problems. Prioritization, funding, and management are the keys to solving the nation's infrastructure needs. The DoD initiatives, mentioned in Alm's article, may help ease the funding problem in this area. The main theme throughout this literature review is that environmental managers need to incorporate many new strategies for dealing with the complex environmental problems they will face in the future. The point to be

made, relevant to this research, is that the solution to many environmental problems is not just found in the technical realm but also in the realm of management. A part of this management approach is organizing the environmental management function in a position where it can be most effective in identifying and executing the solutions to environmental problems.

Conclusion

A review of general management literature found several areas and points of interest for this research. Contingency theory, advocating organizational design according to situational factors, is the most current theory in the literature on organizing. A review of effectiveness models found that organizational structure is part of at least two models. Gibson, Ivancevich, and Donnelly support the idea that effectiveness and organizational structure are related. A broad look at the literature related to measuring effectiveness in service oriented organizations found several approaches. The approach used by an organization will be determined by how that organization wishes to define effectiveness.

The two books on environmental management in the United States showed that environmental managers must try to increase cooperation amongst themselves to improve environmental protection as well as deal with the politics of environmental protection. The two writings on the placement of environmental organizations had two recurring ideas: access and authority. In order for the base environmental organization to achieve environmental compliance it must have both access to the base's decision making authority and its own extension of that

authority. Finally, several articles which deal with the future of environmental management were reviewed. These articles show the complexity and scope of future environmental problems as well as offer solutions which will come from the management arena.

III. Methodology

The primary research instrument used to answer the research question was a survey of individuals working for the Air Force in the area of environmental management. The survey provided data to compare across three areas: base and individual demographic data, individuals' perceptions on differing type of environmental organizations, and their perceptions of their organization's effectiveness. In addition to the survey, interviews with non-Air Force environmental managers, and literature sources were used to determine the type and effectiveness of environmental management functions in other services and civilian corporations. To a lesser degree a literature review was used to compare the analysis of the survey data with past research.

Justification

The answers to the investigative questions lay primarily with the base's and major command's environmental leadership who possessed a great deal of knowledge and practical experience with the different types of environmental organizations. The best available method to get this information was through a survey. Generally, opinions, attitudes and information on past events can only be learned by questioning. Questioning can be carried out by survey or interviews (12:158-159). However, due to the size of the population the survey method was less time consuming than interviewing. Because the issue is of concern to much of the environmental leadership, a high rate of response was anticipated.

Instrument

The measurement questions of the survey stemmed directly from the investigative questions listed in chapter I. The questionnaire used was designed specifically for this research. The concepts behind the survey development came from the literature review of the different methods of measuring organizational effectiveness. Many of the questions used in section III of the questionnaire came from a rating system developed by Kenneth Manchen for corporate environmental departments (23:82). The questions were reworded to make them applicable to a military environmental organization. The questionnaire was approved by Headquarters, Military Personnel Center, and given USAF Survey Control Number 91-13.

There were two forms of the questionnaire, form A was designed for base-level personnel, and form B was designed for major command personnel. The difference between the two forms was that major command personnel were not asked questions specific to base level. The questionnaire was divided into three sections: 1) background information, 2) factual information about the participant's particular environmental organization, and the participant's perceptions about environmental organizations in general, and 3) perceptions about the participants particular base environmental organization's effectiveness. Copies of the questionnaires are at appendix A.

The validity of the questionnaire was established by a pretest on 15 engineering management graduate students. The students were asked to respond to the survey using their last duty station as a reference.

Validity of the questionnaire can also be inferred from the fact that many of the questions used came from a previously tested rating system.

Section I. The first section was designed to gain some basic background information which would be used for comparisons to the data gathered in Section II. Information asked for included:

- Name/Rank or Grade (optional)
- DSN/Autovon Number (optional)
- Position or Job Title
- Major Command
- Type of Environmental Organization at the Base
- Base Size
- Number of Personnel in the Environmental Organization

Position or job title and major command were the only questions asked of major command personnel.

Section II. The second section was designed to gather some facts about the respondent's environmental organization as well as measure perceptions of environmental organizations in general. Questions six through nine were designed to answer the first investigative question: Why, in the past, have bases changed the type of their environmental organizations? These questions were modified, and question seven was eliminated on the major command form of the questionnaire. Question 10 was designed to answer the second investigative question: Should the Air Force adopt a standard type of environmental organization or should the decision be left up to the bases or major commands? Questions 11 through 13 were designed to answer the third investigative question: Is one type of environmental organization more effective than another? Finally, question 14 was designed to answer the fourth investigative question: What factors should be considered when determining the type of environmental organization for a particular base?

Section III. The last section was designed to measure the respondent's perception of the effectiveness of the base's environmental organization. A seven-point Likert scale was used to measure the respondent's perception. Thirteen questions were used to measure effectiveness perceptions. A typical question was:

19. My base's environmental organization is successful at meeting its established goals.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

A 14th question asked the respondent to rate the overall effectiveness of their environmental organization. This question was also used to determine the reliability of the instrument. Additionally, two open-ended questions were asked of the respondent: What do you feel would be the advantages or disadvantages of an environmental management office, branch or section level function over the other types of organizational structures? and Other comments concerning environmental organizations.

Population and Sampling

Description of the Population. The population included: base and major command level personnel all of whom are military officers and officer equivalent civilians who are involved with environmental policy decisions. This included environmental protection committee chairmen, base civil engineers, chiefs of environmental management organizations, environmental coordinators, and environmental managers and engineers. The total population is approximately 450.

Sampling Plan. Because of the small size and diversity of the population, the entire population was sampled. Different aspects of the population included: position and job title, major command, type of environmental organization, size of base, and size of environmental organization. Because of the number of combinations and permutations of these aspects, a sample of anything less than the entire population would have meant that many of these aspects would not have been well enough represented to do adequate statistical testing.

Data Collection Plan

Surveys were distributed to respondents by job title through their individual bases. The surveys were sent to: The Environmental Protection Committee Chairman, Base Civil Engineer, Chief of the Environmental Section/Branch/or Division, The Base Environmental Coordinator, and one other base Environmental Engineer/Manager. The surveys were sent to 80 Air Force bases, for a total of 400 surveys. In addition, 43 surveys were sent to major command environmental managers, for a total of 443 surveys distributed. Respondents were asked to return the completed questionnaire by 31 May 91. Completed questionnaires were individually return mailed.

The data was coded directly from the questionnaire into a computer file for analysis. The file was then checked against the original questionnaires for accuracy. The quantitative data consisted of nominal level data from sections I and II and interval-level data from section III. Also, qualitative data was gathered from the open-ended questions. Nominal level data was coded by numbering of the possible responses.

Operational Definitions. Two operational definitions were established for effectiveness.

Measured effectiveness - The mean of the scores on questions 15 through 27 (form A) or questions 11 through 23 (form B).

Total perceived effectiveness - The rating given on question 28 (form A) or question 24 (form B).

Statistical Tests

The statistical tests used for the analysis included: linear regression, correlation analysis, testing of means, frequencies and percentages and content analysis. Means or percentages and frequencies were calculated for all questions. General linear tests were conducted at an alpha value of .05.

Linear regression and correlation analysis was used to determine if any single item or combination of data gathered from the first section of the questionnaire could predict the measured effectiveness. General linear tests (t tests) were used to determine the statistical significance of any differences found in the distribution of measured effectiveness computed with different combinations of the data gathered from the first section.

Percentages of responses for the different questions in section II were calculated and compared with the results of the regression and correlation analysis, and the general linear tests.

Content analysis was used to analyze the open-ended questions. The content analysis identified key words and phrases, in several categories, used by the respondent. A total count of these words and

phrases was then taken. The results of this analysis were then compared to all other results.

The validity of the questionnaire was determined by correlating the measured effectiveness with the total perceived effectiveness.

IV. Results and Analysis

Introduction

From the sample of 443 surveys sent out, 267 were returned. The response rate for the survey was 60.3%. The response rate was higher than anticipated which revealed that the topic was of considerable interest to environmental managers. Of the 267 returned, 264 were received soon enough, or had adequate information, to be included in the statistical analysis. The remaining 3 were only evaluated on the content of their comments. Of the 400 sent out to base level personnel at 80 Air Force bases 247, or 3.09 respondents per base, were returned for use in the statistical analysis. The test for reliability of the survey showed a coefficient of correlation of .7517 between the measured effectiveness and the total perceived effectiveness, indicating a good reliability for the measure.

The remainder of this chapter summarizes the findings of the survey. In several cases the survey results from both the base and headquarters respondents were combined for analysis. In most cases, under the content analysis, the comments could be categorized easily, but in several cases where comments could not be categorized they are shown exactly as they were found on the survey.

Background Data

Table 1 contains a summary of the background data gathered in section one of the survey. A sixth subcategory of "senior leader" was

created under the position category to differentiate senior leaders from other environmental professionals.

TABLE 1
BACKGROUND DATA SUMMARY

<u>CATEGORY</u>	<u>PERCENTAGE</u>
POSITION	
Chief Environmental Management Section/ Branch/Division	25.9
Base Civil Engineer	21.9
Environmental Protection Committee Chairman	13.0
Base Environmental Coordinator	15.0
Other Environmental Professional	20.2
Senior Leader	3.6
Unknown	0.4
MAJOR COMMAND	
Tactical Air Command	20.2
Strategic Air Command	26.7
Air Force Logistics Command	6.9
Air Force Space Command	4.0
Military Airlift Command	15.4
Air Training Command	12.1
Air Force Systems Command	6.2
Other	8.5
TYPE OF ENVIRONMENTAL ORGANIZATION	
Environmental Management Office	11.3
Branch Level	44.1
Section Level	42.2
Other	2.4
BASE SIZE	
Large (greater than 10,000 military and civilians)	30.4
Medium (between 3,000 and 10,000 military and civilians)	64.4
Small (less than 3,000 military and civilians)	5.2
NUMBER OF PERSONNEL IN THE ORGANIZATION	
Large (10 or more)	21.8
Medium (4 to 9)	58.3
Small (3 or less)	19.9

As table one indicates, the respondents represent a good cross section of people involved with base level environmental issues, from the bases environmental leadership to the environmental engineers and managers. Based on the number of surveys mailed to each major command a return rate percentage was calculated. A comparison of the return rate percentages showed that no major command was over or under represented by more than 1.5%. Note that but for an environmental office located under the chief of programming at the U. S. Air Force Academy, all base environmental organizations could be categorized by one of the three organizations identified by question 3.

TABLE 2
BACKGROUND DATA SUMMARY, HEADQUARTERS RESPONDENTS

<u>CATEGORY</u>	<u>PERCENTAGE</u>
POSITION	
DCS, Engineering and Services	5.9
Chief, Environmental Management Division	29.4
Chief, Environmental Management Section	11.8
Environmental Engineer/Manager	35.3
Other	17.6
MAJOR COMMAND	
Tactical Air Command	17.6
Strategic Air Command	5.9
Air Force Logistics Command	5.9
Air Force Space Command	11.8
Military Airlift Command	11.8
Air Training Command	5.9
Air Force Systems Command	17.6
Other Commands	11.8
Headquarters Air Force	11.8

Table 2 is a summary of the background data collected from headquarters level respondents (form B). An analysis of the return percentages by major command shows that Strategic Air Command and Air Force Logistics Command are under represented by 5.7% and Air Force Systems Command was over represented by 6.0%. All other commands fell within these limits.

Investigative Question One

Table 3 is a summary of the data collected in response to the first investigative question: Why, in the past, have bases changed the

TABLE 3
ENVIRONMENTAL ORGANIZATIONAL CHANGES

<u>CATEGORY</u>	<u>PERCENTAGE</u>
LENGTH OF TIME SINCE CHANGE	
Between 1 and 2 years	41.8
Between 6 months and 1 year	20.0
Less than 6 months	38.2
PRIMARY REASON FOR THE CHANGE	
Increasing/decreasing number of environmental problems	14.6
Increasing number of environmental programs required by new environmental laws/regulations	31.8
An Increasing emphasis from higher command levels	23.6
Reasons unknown to me	1.8
Other reasons	12.7
Marked two or more of first three reasons	15.5
HOW CHANGE IMPACTED OVERALL EFFECTIVENESS	
Increase	76.4
Decreased	2.7
No change	12.7
Do not know	8.2

type of their environmental organizations? Surprisingly, 44.5% of the respondents indicated that their base had changed its type of environmental organization within the last two years. This figure equates to at least 35 of the 80 bases surveyed having reorganized within the last two years. The percentages in the table are based on those bases that had changed their environmental organization within the last two years. A sixth response was created under the category of "PRIMARY REASON FOR ORGANIZATIONAL CHANGE" (question 8 on form A of the survey) as many respondents checked more than one primary reason for change.

Table 4 is a summary of this same data which was collected from headquarters level personnel. The data collected from question 3 (How many of your bases have changed types of environmental organizations

TABLE 4

ENVIRONMENTAL ORGANIZATIONAL CHANGES, HEADQUARTERS LEVEL RESPONDENTS

<u>CATEGORY</u>	<u>PERCENTAGE</u>
PRIMARY REASON FOR THE CHANGE	
Increasing/decreasing number of environmental problems	22.2
Increasing number of environmental programs required by new environmental laws/regulations	22.2
An increasing emphasis from higher command levels	22.2
Reasons unknown to me	0.0
Other Reasons	22.2
Marked two or more of first three reasons	11.1
HOW CHANGE IMPACTED OVERALL EFFECTIVENESS	
Increased	77.7
Decreased	0.0
No change	0.0
Had mixed effects among the different bases.	11.1
Do not know	11.1

within the last two years?) on the headquarters level personnel form was found to be largely inconsistent and was therefore not summarized. Table 5 provides a list of the "other reasons" provided in answer to question 8 (question 4, form B).

TABLE 5

SUMMARY OF OTHER RESPONSES TO QUESTION 8 (Reasons for Reorganization)

<u>RESPONSE</u>	<u>TIMES MENTIONED</u>
BASE	
To better deal with issues.	2
Increased emphasis by base leadership.	2
Wing/OC preference to put back under DE from under CSG/OC	1
To increase manning.	1
Change from staff agency to one with line responsibility.	1
Higher headquarters guidance.	1
Base realignment/closure required regulatory review (failure to obtain permits would threaten mission).	1
DEE chief did not take issues seriously.	1
Lack of performance at lower level.	1
Greater unfiltered access to DE.	1
Moved back to DE due to lack of support.	1
Disestablishment of San Antonio Real Property Maintenance Agency.	1
DE wanted say in workings of environmental organization.	1
DE initiated.	1
HEADQUARTERS	
Management perception of personal needs and not receptive to environmental programs.	1
Lack of base leadership support of EMO concept.	1
A realization that DE could respond to environmental problems.	1

Investigative Question Two

Questions 10 and 6 on the base level and headquarters level surveys respectively were designed to help answer the second investigative question: Should the Air Force adopt a standard type of environmental organization or should the decision be left up to the bases or major commands? The data gathered is summarized in table 6.

TABLE 6
REGULATING ORGANIZATIONAL STRUCTURE

<u>CATEGORY</u>	<u>PERCENTAGE</u>
BASE LEVEL	
Adopt a standard type of environmental organization at base level	29.1
Allow major commands to decide	23.1
Allow the bases to decide	47.0
Did not answer	0.8
HEADQUARTERS LEVEL	
Adopt a standard type of environmental organization at base level	17.6
Allow the major commands to decide	41.2
Allow the bases to decide	35.3
Did not answer	5.9

Investigative Question Three

The analysis of the data collected to answer the third investigative question involves several factors, including the analysis of the data collected by questions 11 and 12 (questions 7 and 8, form B), and statistical tests of the data gathered by section III of the survey.

TABLE 7

TYPE OF ENVIRONMENTAL ORGANIZATION SELECTED AS MOST EFFECTIVE

<u>TYPE</u>	<u>PERCENTAGE</u>
BASE LEVEL	
Environmental Management Office	45.4
Branch Level	47.5
Section Level	2.2
Other	4.9
HEADQUARTERS LEVEL	
Environmental Management Office	30.8
Branch Level	53.8
Section Level	0.0
Other	15.4

The first part of this analysis deals with the participant's perception of which type of environmental organization is most effective. Of those surveyed 64.4% at the base level and 70.6% at the headquarters level indicated that they felt that one type of environmental organization was more effective than another. Table 7 provides a summary of the data gathered from questions 12 and 8 of the base and headquarters level surveys respectively. In addition four respondents mentioned that any decision to place the environmental organization should be made within some type of guidance provided by Air Force headquarters or the major commands. Some of the other organizational structures suggested were: a branch level function with direct access to the base leadership (2 respondents), an environmental management office with environmental engineers within civil engineering for coordination and project design (1 respondent), and centralized

environmental offices for different regions of the country (1 respondent). The concept for centralized environmental offices was well defended by this respondent.

The second part of the analysis deals with the objective measure of measured effectiveness to determine if one type of environmental organization is more effective than another. Statistical methods were used to make this determination. Simple correlations were calculated between the background data gathered and the measured effectiveness. The coefficients of correlation (r) are in table 8. Of primary consideration was the correlation between organizational type and measured effectiveness. As expected, relatively large positive correlations were found between number of people in the organization and organization type, between base size and number of people, and between base size and organizational type. Unexpectedly there was some correlation between measured effectiveness and number of people, and between measured effectiveness and the respondents position.

TABLE 8
SIMPLE CORRELATIONS

	<u>POSITION</u>	<u>ORG. TYPE</u>	<u>BASE SIZE</u>	
<u>NO. PEOPLE</u>				
ORG. TYPE	0.0737			
BASE SIZE	0.0464	0.2325		
NO. PEOPLE	0.0749	0.6013	0.3826	
MEASURED EFFECTIVENESS	0.1534	0.1769	0.0371	0.3000

A direct comparison between the three types of environmental organizations found that the measured effectiveness of the environmental management offices, at 4.95, was significantly higher than the other two types of organizations. It was also noted that the measured effectiveness of the section level function and the branch level function were approximately the same at 4.44 and 4.40 respectively. The fact that many functions have just recently moved to the branch level was thought to have some impact on effectiveness. The mean measured effectiveness across all respondents was 4.47.

The relationship between major command and measured effectiveness is shown in table 9.

TABLE 9
MAJOR COMMAND AND EFFECTIVENESS

<u>MAJOR COMMAND</u>	<u>MEASURED EFFECTIVENESS</u>
Air Force Logistics Command	5.10
Air Training Command	4.80
Air Force Space Command	4.75
Tactical Air Command	4.62
Air Force Systems Command	4.54
Strategic Air Command	4.35
Military Airlift Command	4.21
Others	3.78

Investigative Question Four

Table 10 contains a summary of the data gathered to help answer the fourth investigative question: What factors should be considered when determining the type of environmental organization for a

particular base? The table includes both responses from base level as well as headquarters level.

TABLE 10
CONSIDERATION FACTORS

<u>CATEGORY</u>	<u>PERCENTAGE</u>
BASE LEVEL	
The scope of the bases environmental problems	39.7
The scope of the bases environmental programs	25.1
The availability of resources (manpower, vehicles, etc.)	12.1
Other factors	7.3
Marked more than one of the factors	13.8
Did not answer	2.0
HEADQUARTERS LEVEL	
The scope of the bases environmental problems	41.2
The scope of the bases environmental programs	35.2
The availability of resources (manpower, vehicles, etc.)	0.0
Other factors	0.0
Marked more than one of the factors	5.9
Did not answer	17.6

In addition to the provided responses many respondents provided other factors which they either consider as the primary factor or an equally important factor in determining the placement of the environmental organization. The additional factors are summarized in table 11.

Closely related to both the third and fourth investigative questions were the comments provided in answer to question 13 and question 29. When asked, by question 13 (question 9, form B), why they felt the type of environmental organization they chose was more

TABLE 11

OTHER FACTORS PROVIDED BY THE RESPONDENTS

<u>FACTOR</u>	<u>TIMES MENTIONED</u>
All of the above	12
Relationship with state and local regulatory agencies	4
State and local environmental law and regulations	2
Community perceptions/history	2
Legal responsibilities under the law	2
Proper authority to accomplish objectives	2
Capability/skill of the environmental staff	2
Existing organizational relationships	2
Base size and complexity	2
Ownership for executing programs	2
Bioenvironmental engineering should be included	1
Capacity to function effectively	1
Scope of problems in relation to availability of resources	1
Capability of civil engineering	1
Amount of support from the rest of the base	1
Depends on who the organization has to work closely with	1
Increased communication between bases and headquarters to ensure similar methods are being used by bases	1
Access to base computer systems	1
Impact of tenant units on environmental compliance	1
Interest of DE and base commander to the problems	1
Relationship to base leadership	1
Attitude of senior leadership to seek/accept environmental policy guidance	1
The one that gets the most support	1
Increased command attention to the problems identified	1
Independent of DE	1

effective, almost all the respondents listed the advantages of the one they chose and the disadvantages of the others. Since these responses matched so closely the comments provided under question 29 (question 25, form B), which asked the respondent what were the advantages and disadvantages to each type of organization, the comments from each question were combined and a content analysis performed. Comments from both the base level and headquarters level respondents were combined in

this analysis. Combining the numbers of the two forms shows that 71.2% of the respondents provided comments to question 13 (question 9, form B), and 72.0% of the respondents provided comments to question 29 (question 25, form B).

The results of the content analysis are summarized in tables 12 through 16. Table 12 lists the advantages of a separate environmental management office while table 13 lists its disadvantages. Table 14 lists the advantages of a branch level environmental organization while table 15 lists the disadvantages. Table 16 summarizes the advantages and disadvantages of a section level environmental organization.

Most of the disadvantages of the branch level function were implied to exist also for the section level function since they both fall under the base civil engineer. Many of the advantages of the branch level function were implied to be advantages as compared with a section level function (as opposed to comparison with an environmental management office). However, many of the advantages of a branch level function were also advantages as compared to an environmental management office.

Investigative Question Five

Investigative question five asks: What type of environmental organizations do other services and civilian corporations have and how effective do they feel their environmental management function are? In order to answer investigative question five, environmental managers from the Navy and Army along with civilian corporations were contacted and interviewed. The results of these interviews indicated that both

TABLE 12

ENVIRONMENTAL MANAGEMENT OFFICE ADVANTAGES

<u>ADVANTAGE</u>	<u>TIMES MENTIONED</u>
Increased visibility	55
Cuts a layer of management	42
Increased authority	24
Central function (having all personnel needed in one office)	18
Keeps base leadership better informed	12
Direct dialogue with other commanders/units	12
Increased resources	12
Clear command responsibility	8
Increased manning	7
Increased funding	7
Autonomy	6
Increased support	6
Better command support	5
More responsive to the base leadership	4
Reflects increased base support to regulators	4
Increased responsibility	4
Increased grade levels	3
Ability of task other organizations/force support	3
Equal status	3
Multi organizational issues/complexity of work	3
More objective	3
Senior management involvement	2
Single point of contact to the public	2
Increases experienced personnel	2
Reduces distractions	2
Increased credibility	1
Greater impact on wing operations	1
Increased coordination and efficiency	1
Allow for better growth of the organization	1

the Navy and Army are debating the same questions that this research is trying to address.

Navy. In a telephone interview, Lt Omdr Daniel Spiegelberg of the Naval School, Civil Engineering Corps Officers, stated that at base level, the environmental organization typically works for the base's Public Works Officer, or in some cases for the base's Executive

Officer, but almost never for the Base Commander (32). In a second telephone interview, Mr. Wade Jensen of Headquarters, Naval Facilities Engineering Command, stated that at least 90% of naval bases have the environmental function under the Public Works Officer. In many situations where the environmental function works for the base's Executive Officer, it is still attached and receives much of its support from the Public Works Officer. At many bases the environmental function is being moved out from under the engineering function and placed under the Assistant Public Works Officer or directly under the Public Works Officer. In addition, Mr. Jensen confirmed that the Navy is finding the same advantages and disadvantages for the various organizational structures found by this research (20).

Army. Dr. Robert York of the Army's Toxic and Hazardous Materials Agency, confirmed that, the Army's environmental organizational structure is much the same as both the Navy's and Air Force's. At the base level most Army environmental organizations are located under the Director for Engineering and Housing (DEH), with one to two exceptions where the environmental organization works for the installation commander. In these case the organization was changed to a Directorate for Environment, Safety, and Occupational Health, typically in response to extensive environmental problems at the installation (36).

Lt Col Graven, of the Army's Environmental Office, confirmed that, like the Navy and Air Force the Army is debating the same issues when it comes to placing the environmental office on the installation. The Army is in the process of rewriting Army Regulation 5-3 which

TABLE 13
ENVIRONMENTAL MANAGEMENT OFFICE DISADVANTAGES

<u>DISADVANTAGE</u>	<u>TIMES MENTIONED</u>
Outside of civil engineering support	19
Loss of touch with the base	6
Strips other organizations of manpower	6
Does not receive day-to-day attention and support	5
Too political (power struggles, tensions, etc.)	5
Becomes an oversight body and not a working unit	5
Becomes just another customer fighting for DE resources	4
Increased overhead	3
Duplication of some work	2
Strips other organizations of resources	2
To much visibility	1
Adversarial relationship with civil engineering	1
Management of a diverse group	1
No real increase in grades	1
Monopolizes other base resources	1
Too autonomous (will not listen to others)	1

spells out organizational structure across the Army. The debate, as far as environmental organizational structure is concerned, centers on the decision of whether to: 1) put the environmental office directly under the installation commander, 2) put the environmental office directly under the DEH (as a minimum), or 3) let the installations decide where to place the environmental organization. Even if option three is chosen the minimum placement of the environmental office on the base will be working directly for the DEH.

Lt Col Graven also pointed out several advantages to each type of organizational structure. While the advantages he mentioned for a separate environmental office were much the same as were found by this research, he mentioned several different advantages and issues

TABLE 14
BRANCH LEVEL ADVANTAGES

<u>ADVANTAGE</u>	<u>TIMES MENTIONED</u>
Has support and resources of Civil Engineering available	65
Cuts a layer of management	29
Increased visibility	17
Influence the actions of other DE branches	16
DE has experience to manage long term complex projects	12
Right level of emphasis/focus on issues	11
Having the DE as an advocate for environmental programs	8
Easier to interact with base commander	6
DE is one of the biggest environmental customers	5
More aware of environmental funds availability	4
Increased grades	3
DE is already responsible for the base infrastructure	3
Flexibility	3
Major command counterpart is under DE	2
Increased emphasis	2
Will not lose contact with the field	1
Increased authority	1
Gets results	1
Stability	1
More responsive	1
Not just an oversight organization	1
Not micro managed	1

associated with having the environmental organization under the DEH.

One important issue was the Army's attempt to change the environmental ethic of their DEHs in an attempt to make the DEH the bases' principal staff member for the environment. Additionally, Lt Col Graven stated that, "... while he (the DEH) may be part of the (environmental) problem he also is part of the solution." In other words, while having the environmental organization as part of engineering may seem like a conflict of interest, since this is where many of the environmental

TABLE 15
BRANCH LEVEL DISADVANTAGES

<u>DISADVANTAGE</u>	<u>TIMES MENTIONED</u>
Hidden/Additional staff layer to base leadership	11
Environmental programs get lost in other DE priorities	10
DE lacks authority to ensure compliance	6
Conflict of interest	3
Appearance of only being a DE program	3
Other DE branches feel regulated	1
Internal DE politics	1
Little "corporate knowledge"	1
Can not delegate up the chain of command	1

problems are identified, it is this same function that must be a part of the solution to the problem (16).

Civilian Corporations. In order to compare the issue of organizational placement of the environmental function with industry, environmental managers from Mead Corporation and Florida Power and Light Company were interviewed as well as an Environmental Protection Agency (EPA) representative.

Mr. Russell Kross, Vice President of Human and Environmental Protection for Mead, explained that his department fell under the Vice President of Manufacturing and Technology who in turn works for the President of the company. Within his department, Mead has combined not only environmental protection but also human health and safety as well as product safety. Originally this department was part of research under the vice president for manufacturing and technology. Mr. Kross also explained that at one time Mead considered having the department work for the president but did not because of the close interface that

TABLE 16
SECTION LEVEL ADVANTAGES/DISADVANTAGES

<u>ADVANTAGES</u>	<u>TIMES MENTIONED</u>
Better span of control	1
<u>DISADVANTAGES</u>	
To far down in the chain of command	22
Loses out to other DEE priorities	9
No visibility	6
No authority	2
Can not directly communicate with DE	1
No support	1

is needed between environmental protection and the manufacturing and technology departments. Mr Kross also noted that many chemical companies where in the process of organizing along lines similar to Mead (22).

Mr. Martin Smith, Manager of Environmental Permitting and Programs for Florida Power and Light Company, explained that his department fell under the Senior Vice President for External Affairs. Originally the environmental function was part of the operating group until a recent reorganization created the External Affairs department. Mr. Smith stated that he felt this move was part of what he termed an evolutionary process for the environmental organization and that functioning as a separate office from the operating group would not work if they had not started out as part of the operating group. In other words, in the 1970's as the company was working to understand and come into compliance with the new environmental law a close working

relationship with the operating group was essential. Now that much of the initial work is complete, the environmental organization, with an understanding of the operations of the company, can better look ahead and plan for the future. As part of the external affairs group, Mr. Smith hopes that his department can act as an interface between environmental interests and the company and work to provide unfiltered information to the company's top decision makers (31).

In addition, Mr. Jim Hayes of the Environmental Protection Agency, stated that the majority of industry still has their environmental function located within the engineering function of the corporation, or as part of the legal function if most of the corporation's environmental work is done by contract (18).

Other Comment Analysis

In addition to the comments made regarding the advantages and disadvantages of each type of organization, many valuable comments were made by the respondents to question 30 (question 26, form B), other comments concerning environmental organizations. 54.4% of the respondents provided comments to this question. In addition to comments concerning environmental organizations, many of the respondents commented on problems concerning Air Force environmental management as a whole. A content analysis was performed on both types of comments separately. Table 17 provides a summary of the other comments concerning environmental organizations and table 18 provides a summary of the comments on general problems.

To better analyze the problems uncovered by these comments a detailed analysis of the 13 questions from section III of the survey,

TABLE 17
OTHER COMMENTS

<u>COMMENT</u>	<u>TIMES MENTIONED</u>
Bases must have the flexibility to tailor the environmental organization to their own base.	45
Base leadership support of the environmental programs is a must no matter where the organization is located	22
The quality of the people working the environmental program is the most important factor to success	9
The location of the environmental function should be the same Air Force wide	7
The environmental organization should not be below branch level in DE	4
Base civil engineer support of the environmental programs is critical	2
The environmental protection committee is the critical element	1
Do not duplicate other organizations functions such that they fell they have a waiver of responsibility	1
Must include natural resources, community planning, and historical preservation	1

which made up the effectiveness measure was performed. The results of the analysis are in table 19. The analysis only includes data from the base level respondents.

The results of this analysis mirrored the problems identified by the content analysis shown in table 18. Those questions having the lowest mean were manpower and funding questions. These two problems were most often mentioned in the survey comments.

Problems with the Survey

Several problems with the survey were also identified by the respondents.

TABLE 18
COMMENTS ON PROBLEMS

<u>PROBLEM</u>	<u>TIMES MENTIONED</u>
Manpower	53
Funding	25
Education/training at all levels	16
Grades	15
Resources	14
Base leadership support of programs	11
Salaries/turn over of qualified personnel	10
Always working in a reactionary mode	6
Need separate military career area	5
Concern and cooperation of other units on base	5
Regional offices needed for guidance	5
Environmental protection committee largely ineffective	4
Need more legal support	3
Environmental engineers are hard to find to fill positions	3
Inadequate guidance from higher headquarters	3
Contracting problems	3
Funding is held by headquarters level	2
Need more technician level personnel	2
Relationships with regulators	2
Everyone thinks environmental is a DE responsibility	2
Do not need military as part of the staff	2
Lack of experienced personnel	1
Too much study, too little action	1
Red tape	1
Have to answer to many people (regulators and headquarters)	1
Showing a credible face to regulators	1
Do not need military in supervisor roles	1
Too many higher headquarters reports	1
Better personnel mix (technical vs nontechnical)	1
Need more military as part of staff	1
Chain of command philosophy	1
No coherent DoD plan	1
No clear chain of career progression	1
Administrative support	1
Communications between DE and Bioenvironmental engineering	1

The wording of question 10 may have misled some of the respondents. The question reads: Do you feel that, in general, one type of environmental organization is more effective than another? The

TABLE 19
ANALYSIS OF EFFECTIVENESS QUESTIONS

<u>QUESTION</u>	<u>MEAN</u>	<u>STD.DEV.</u>
15. My base's environmental organization has adequate manpower to manage our environmental program.	2.51	1.68
16. My base's environmental organization has adequate funding to manage our environmental program.	2.97	1.71
17. My base's environmental organization has adequate resources to manage our environmental program.	3.11	1.66
18. My base's environmental organization has adequate facilities to manage our environmental program.	3.58	1.79
19. My base's environmental organization is successful at meeting its established goals.	4.32	1.75
20. The personnel in my base's environmental organization are well educated in the environmental field.	4.96	1.69
21. The personnel in my base's environmental organization are well experienced in the environmental field.	4.70	1.68
22. My base's environmental organization keeps the base's environmental protection committee well informed of environmental issues affecting the base.	5.83	1.21
23. My base's environmental organization keeps the base and local community well informed of environmental issues concerning the base.	5.08	1.47
24. My base's environmental organization is up to date on current issues and technical advances in the environmental field.	4.88	1.48
25. My base's environmental organization has a good working relationship with regulatory agencies.	5.82	1.22
26. My base's environmental organization works well with other base agencies.	5.60	1.17
27. My base's environmental organization keeps the base in compliance with all environmental laws and regulations.	4.75	1.56

possible answers were: Yes, No, and Unsure. It was the intent of the question for the respondent to consider their answer as "in general" to mean across the Air Force. Some of the respondents answered No or Unsure, but then went on to the next two questions which they were instructed to skip. Therefore some of the answers to questions 12 and 13 may be somewhat in error.

Question 27 (question 23, form B) was believed by several respondents to have a faulty premiss. The question reads: My base's environmental organization keeps the base in compliance with all environmental laws and regulations, with the respondents marking their choice on a seven point likert scale. Many respondents stated that in actuality it is the entire base which must work to keep the base in compliance with environmental laws and regulations, not just the environmental organization. It was not the intent of the question to imply that compliance with the environmental laws was solely a responsibility of the environmental organization. Perhaps the question should have been worded: My base's environmental organization contributes toward keeping the base in compliance with all environmental laws and regulations.

Many of the respondents criticized the survey as being either too general or not covering certain problems. There may have been a misconception by these respondents as to what particular issues the survey was supposed to be covering. It was not the intent of the survey to address all environmental management problems. However, the respondents were given adequate space to write in comments that they

felt were relevant to the subject as well as to address other environmental management problems.

The majority of the additional comments were positive in nature.

V. Conclusions and Recommendations

Introduction

Overall the survey was very successful in helping to answer the investigative questions and the research question as well as providing an insight into the current status of the Air Force's environmental management program. The excellent response rate of 60.3% reflects a great deal of interest in the topic amongst the Air Force's environmental leadership and management. In addition to the numerous comments, many respondents sent in supplementary information such as point papers, summaries, and suggestions that they had submitted, on changing the organizational structure of the environmental management function at their base. The open format of the survey may have contributed to the success in getting good written comments. The fact that the respondents did not have to fill in a separate computerized answer sheet may also have contributed to the success of the survey. An additional benefit of the survey was the identification of problem areas in environmental management. Among these, manpower and funding were the top two.

The background data shows that no particular segment of the population (major command, respondent position, etc.) was over or under represented. Therefore, it was not difficult to generalize the results across CONUS Air Force bases.

Since the problems found with the survey (discussed in chapter four) were minor, it is not believed that they have a significant

bearing on the conclusions. However, due to the low response rate from the major command level environmental managers, a headquarters level perspective may be somewhat lacking in the conclusions.

In the remainder of this chapter, each of the investigative questions as well as the research question will be answered, some of the problems in environmental management which were identified will be discussed, key items to address if a base is considering changing its type of environmental organization will be identified, and recommendations for further research into some of the problems identified will be made. Additionally, some of the comments provided by the survey respondents are included in this chapter. These comments, in many ways, summarize the points to be made and hopefully add credibility and a base level perspective to the conclusions and recommendations.

Conclusions

Investigative Question One. The purpose of the first investigative question was to determine if there was a primary reason for past changes in the respondent's environmental organization. The analysis of the survey for this question did not indicate a prevalent reason for change. The results from the headquarters level analysis mirrored the base level results.

The results of the survey indicated that almost half of the bases surveyed had changed the type of their environmental organization within the last two years. A vast majority of the respondents, 76.4%, indicated that the change increased overall effectiveness. By this it would seem that the majority of the respondents favored the change that

took place. The two most popular reasons for change were: increasing number of environmental programs required by new environmental laws/regulations, and increasing emphasis from higher command levels. There were no consistent other reasons which were written in by the respondents. Since over a quarter of the respondents could not identify one primary reason for the change in types of environmental organizations, there appears to be no truly dominant reason.

Investigative Question Two. The purpose of the second investigative question was to determine if the Air Force should adopt a standard type of environmental organization or if the decision as to the type of environmental organization should be left up to the major commands or the bases. No single response was preferred by a large majority of the respondents. Much as expected the majority of the base level respondents wanted the bases to control the decision, whereas, many of the headquarters level respondents thought that the decision should be made at the major command level.

Though there was no clear cut guidance from the respondents as to what level of command should decide on environmental organizational structure, a review of the other comments provided by the survey respondents showed that 45 of the approximately 145 respondents stated that the flexibility to tailor the environmental organization to a base is essential. Some of the best comments regarding this question were made by Lt Col Tom Black, Base Civil Engineer at Lowry AFB, who stated:

Flexibility is a must for the environmental management function. Each base generally has a unique set of programs, problem areas, resources, regulatory emphasis, and management philosophy to contend with. What works well at one will not necessarily work at another. (5)

Based on this response it would seem the answer to the investigative question is to let the bases decide where to place the environmental organization.

Investigative Question Three. The purpose of the third investigative question was to determine which, if any, type of environmental organization is the most effective. The two step approach used was: (1) determine if there was a preference for one type of environmental organization at the base level, and (2) attempt to objectively measure effectiveness for the different types of organizations.

There was a strong opinion amongst respondents that one type of environmental organization was more effective than another. 64.4% of the base respondents and 70.6% of the headquarters respondents felt that one type of environmental organization was more effective than another. Of those who expressed an opinion, 45.4% felt that an environmental management office was most effective while 47.5% felt that a branch level function was most effective. The section level function and other types of organizations were not well supported.

The statistical analysis of the objective measure of effectiveness revealed that the environmental management office was, in general, more effective than other types of organizations. However, it was also noted that most branch level functions were less than two years old whereas most environmental management offices were more than two years old. To some degree this fact may contribute to the environmental management offices' greater effectiveness. Finally, it should be remembered that, while it can be considered an objective

measure, measured effectiveness is in large a measure of the perceptions of how well the bases feel they are doing in the area of environmental management.

In support of environmental management offices, an analysis of effectiveness by major command shows that Air Force Logistics Command, which has only environmental management offices, is, environmentally, the most effective command. However, Air Training Command, which primarily has section level functions is the second most effective. To some degree this higher effectiveness of particular major commands may be a reflection of various factors. For instance, the higher measured effectiveness may reflect the overall command interest in the environment, command specific factors, or effectiveness of the headquarters environmental staff as opposed to the type of environmental organization prevalent in the command.

Based on the two analyses discussed above, there is not enough evidence to support a conclusion that one type of environmental organization is truly more effective than another. There is not enough of a difference between the environmental management office's mean measured effectiveness of 4.95 and the branch level's mean measured effectiveness of 4.40, or indeed, even the section level's. Additionally, there was not overwhelming support for any one organization though respondents were definitely "underwhelming" in their support of the section level function.

Investigative Question Four. The purpose of the fourth investigative question was to determine what factors should be considered when determining the type of environmental organization for

a particular base. The results of the survey showed that there were many factors which should be considered.

An analysis of the survey results found that the scope of the base's environmental problems was the most frequently marked factor, followed by the scope of the base's environmental programs. However, 33.2% of the respondents considered either other factors, two factors, or all of the factors listed to be the primary factors considered. Of the other factors provided by the respondents, relationships with state and local regulators was one factor included by four different respondents. All other factors were only mentioned by two or less respondents. The headquarters level responses closely mirrored the base level results.

The advantages and disadvantages of each type environmental organization analyzed under this investigative question are summarized later in this chapter.

Investigative Question Five. The purpose of the fifth investigative question was to determine what type of environmental organizations the other services and civilian corporations have and how effective they are. The environmental organizational situation of the other services was found to be similar the Air Force's situation, while civilian corporations have a different approach to environmental management.

Both the Army and the Navy are looking at their environmental organizations and trying to determine what will be the most effective type of environmental organization for the future. Both services are somewhat behind the Air Force in establishing separate environmental

offices similar to the Air Force's environmental management offices. Both services reported the same advantages and disadvantages with all types of environmental offices as this research found. Neither service felt that they would institute a mandatory type of environmental organization in the future, leaving the decision up to each individual bases.

The two civilian corporations contacted revealed that their environmental management functions were more centralized than the Air Force's. While neither of these companies' environmental management organizations reported directly to the corporation president, they were headed by senior company officials.

Research Question. The answer to the original research question, what is the best organizational design for the environmental organization, may be found in the answers to the five investigative questions. Based on these answers, there is no one best environmental organizational design. There is no conclusive evidence that one type of environmental organization is truly more effective than another type. The decision on which type of environmental organization to have should be left up to the individual base to be based on the individual installation's problems and situation.

Recommendations

While there is no conclusive evidence that one type of environmental organization is truly more effective than another type, the section level function was so poorly supported by the survey respondents that it is recommended, by this research, to make all environmental organizations, at a minimum, a branch level function.

Additionally, it is recommended that the decision of where to place the environmental organization be left up to the bases. Based on other comments of the survey respondents, it is further recommended that the environmental organization be given full leadership support, and the opportunity and ability to hire quality personnel.

Decision Factors. While there is no single reason why environmental organizations have changed in the past, nor is there one single factor to consider when placing the environmental organization in the future, there are distinct advantages and disadvantages to each type organization. The following discussion summarizes the key advantages and disadvantages of an environmental management office and a branch level environmental function. It is recommended that each of these factors be considered before reaching a decision as to where to place the environmental organization on a base. Additionally each of these factors must be considered in light of the particular base's environmental problems, number of programs, resources, and relationships with state and local regulatory agencies.

There are several advantages and disadvantages to having an environmental management office. One advantage is the increased visibility both to the leadership and the base as a whole that the position of working directly for a senior base leader affords. Also this higher position cuts a layer of management, thus speeding communications as well as reducing the filtering of information, consequently keeping the base leadership better informed on environmental issues. An environmental management office has increased authority as well as easier access to other unit commanders. There are

advantages to having all environmental personnel working in one central office, although to some degree this can be accomplished in a branch level function as well. Additionally, an environmental management office may be able to obtain increased manning and grade levels.

With these advantages come several disadvantages. The largest disadvantage is that this organization is outside of the base civil engineering organization on which it depends for much of its support. It now has to compete with other organizations for the base civil engineer's scarce resources. This point was summarized by the comments of Mr Darrel Cullins, Environmental Engineer at Loring AFB, who stated:

If we change to a management office (from a branch office), there is a concern as to whether the possible loss of some good support we presently get from different civil engineering organizations would be compensated by greater support from other base organizations. (9)

Also, the organization could lose touch with the base and simply become an oversight body, identifying problems but not truly helping to solve them. Additionally this newly formed environmental management office can strip other organizations of much needed manpower and resources.

A civil engineering branch level environmental management function also has several advantages and disadvantages. One of its greatest advantages is that it is close to the support and resources of the base civil engineer. Additionally, civil engineering has the experience and expertise to manage the long term, complex projects which are required to solve most environmental problems. At the branch level, the base civil engineer himself can serve as a strong advocate for environmental programs. Also, the base civil engineer has one of the largest impacts on the environment as the base's infrastructure is

his responsibility. Finally, many respondents to the survey felt that placement as a branch gave the right amount of emphasis and focus on environmental issues. The advantages to keeping the environmental organization within the civil engineering organization are best summarized by the comments of Lt Col Allan Bean, Base Civil Engineer at Loring AFB, who states:

...the higher placed the Environmental Unit is at base level, the less likelihood the BCE (base civil engineer) knew or could affect action. ... We don't write ourselves a letter -- we just fix it. (4)

There are also some disadvantages to a branch level function. The key ones are: being hidden by an additional staff layer, environmental priorities being lost to other civil engineering priorities, and the base civil engineer may lack authority to ensure environmental compliance.

It is not the purpose of this research to advocate one of these environmental organizations over another. This list of advantages and disadvantages is not all inclusive. Many of the disadvantages can be overcome as long as they are identified up front. Conversely, without commitment, many of the advantages may never be fully realized. With full leadership support either type of environmental organization can be fully effective.

Further Research. Many of the problems identified by the survey are currently being worked at different levels throughout the Air Force. However, it is recommended that further research be conducted on the problems many bases are having with manpower.

Manpower was identified as a problem by its low effectiveness measurement area, and by 53 of the approximately 145 respondents who

provided additional comments. Further research on the subject of environmental organizational placement should wait two to three years until the recently established functions have had time to settle into their new organizational locations.

Appendix A: Environmental Organizations Questionnaires

ENVIRONMENTAL ORGANIZATIONS QUESTIONNAIRE
(Form A - for base level personnel)

Instructions: Select your responses directly on the questionnaire booklet; a separate answer sheet is NOT necessary and has NOT been provided. Please provide your written comments in the blank spaces provided. Please answer each question as honestly as possible. Additional instructions are provided at each section; please read them carefully before you begin.

SECTION I Background Information

Instructions: Select the appropriate response(s) to each question. Your name/rank or grade and DSN/Autovon are OPTIONAL.

Name/Rank or Grade (OPTIONAL) _____.
DSN/Autovon Number (OPTIONAL) _____.

1. What is your current position? (Select as many as apply)

- ☐ Chief, Environmental Management Section/Branch/Division
- ☐ Base Civil Engineer
- ☐ Environmental Protection Committee Chairman
- ☐ Base Environmental Coordinator
- ☐ Other (please specify) _____.

2. To which major command do you belong?

- ☐ TAC ☐ MAC
- ☐ SAC ☐ ATC
- ☐ AFLC ☐ AFSC
- ☐ Space ☐ Other (please specify) _____.

3. Which type of environmental organization best describes the type you have at your base?

- ☐ Environmental Management Office (working directly for an installation, wing, or base commander)
- ☐ Branch Level (DEV, working directly for the base civil engineer)
- ☐ Section Level (DEEV, working for the Chief, Engineering and Environmental Planning)
- ☐ Other (please describe) _____.

4. How would you best describe the size of your base?

- ☐ Large (greater than 10,000 military and civilian)
- ☐ Medium (between 3,000 and 10,000 military and civilian)
- ☐ Small (less than 3,000 military and civilian)

5. How many people work in your environmental organization?

SECTION 11.

Instructions: Select only ONE response to each question. A "No" or "Unsure" response to some questions will require you to skip over several of the following questions which follow up on the same subject, so please read each response carefully.

6. Has your base changed its type of environmental organization within the last two years?

☐ Yes ☐ No ☐ Unsure (If No or Unsure SKIP TO QUESTION 11).

7. How long has your base had your current type of environmental organization?

☐ Between 1 and 2 years
☐ Between 6 months and 1 year
☐ Less than 6 months

8. What would you describe as the PRIMARY reason for this change?

☐ Increasing/decreasing (circle one) number of environmental problems at my base.
☐ Increasing number of environmental programs required by new environmental laws and regulations.
☐ An increasing/decreasing (circle one) emphasis from higher command levels.
☐ Reasons unknown to me.
☐ Other (please specify) _____.

9. How do you feel that this change impacted the overall effectiveness of your environmental organization?

☐ Increased the overall effectiveness of the environmental organization.
☐ Decreased the overall effectiveness of the environmental organization.
☐ No change in overall effectiveness of the environmental organization.
☐ Do not know how it affected the overall effectiveness of the environmental organization.

10. How do you feel the Air Force should regulate the organizational structure of the environmental organization?

☐ Adopt a standard type of environmental organization at base level.
☐ Allow the major commands to decide on the type of environmental organization at base level.
☐ Allow the bases to decide on the type of environmental organization at base level.

11. Do you feel that, in general, one type of environmental organization is more effective than another?

☐ Yes ☐ No ☐ Unsure (If No or Unsure SKIP TO QUESTION 15)

12. Which type of environmental organization do you feel would be the most effective at base level?

- ☐ Environmental Management Office (working directly for an installation, wing, or base commander)
- ☐ Branch Level (DEV, working directly for the base civil engineer)
- ☐ Section Level (DEEV, working for the Chief, Engineering and Environmental Planning)
- ☐ Other (please describe) _____.

13. Why do you feel that this type of environmental organization would be more effective than others? (written comments please)

14. If you were going to decide on the type of environmental organization to have at your base, which of these factors would you consider most important.

- ☐ The scope of the bases environmental problems.
- ☐ The scope of the bases environmental programs.
- ☐ The availability of resources (manpower, vehicles, etc.).
- ☐ Other factors (please describe) _____.

SECTION III.

Instructions: Please circle the number that corresponds to your response on the following questions.

15. My base's environmental organization has adequate manpower to manage our environmental program.

Strongly			Neither			
Disagree	Disagree	Slightly	Agree or	Slightly	Agree	Strongly
		Disagree	Disagree	Agree		Agree
1	2	3	4	5	6	7

16. My base's environmental organization has adequate funding to manage our environmental program.

Strongly			Neither			
Disagree	Disagree	Slightly	Agree or	Slightly	Agree	Strongly
		Disagree	Disagree	Agree		Agree
1	2	3	4	5	6	7

17. My base's environmental organization has adequate resources (supplies, equipment and vehicles) to manage our environmental program.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

18. My base's environmental organization has adequate facilities to manage our environmental program.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

19. My base's environmental organization is successful at meeting its established goals.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

20. The personnel in my base's environmental organization are well educated in the environmental field.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

21. The personnel in my base's environmental organization are well experienced in the environmental field.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

22. My base's environmental organization keeps the base's environmental protection committee well informed of environmental issues affecting the base.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

23. My base's environmental organization keeps the base and local community well informed of environmental issues concerning the base.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

24. My base's environmental organization is up to date on current issues and technical advances in the environmental field.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

25. My base's environmental organization has a good working relationship with regulatory agencies.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

26. My base's environmental organization works well with other base agencies.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

27. My base's environmental organization keeps the base in compliance with all environmental laws and regulations.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

28. On a scale of 1 to 7, how would you rate the overall effectiveness of your environmental organization?

Poor	Marginal		Fair	Excellent		Outstanding
1	2	3	4	5	6	7

Additional Comments

29. What do you feel would be the advantages or disadvantages of having one type of environmental organization (environmental management office, branch or section level function) over the other types.

30. Other comments concern environmental organizations.

31. Comments concerning this questionnaire.

ENVIRONMENTAL ORGANIZATIONS QUESTIONNAIRE
(Form B - for headquarters level personnel)

Instructions: Select your responses directly on the questionnaire booklet; a separate answer sheet is NOT necessary and has NOT been provided. Please provide your written comments in the blank spaces provided. Please answer each question as honestly as possible. Additional instructions are provided at each section, please read them; carefully before you begin.

SECTION I Background Information

Instructions: Select the appropriate response(s) to each question. Your name/rank or grade and DSN/Autovon are OPTIONAL.

Name/Rank or Grade (OPTIONAL) _____.
DSN/Autovon Number (OPTIONAL) _____.

1. What is your current position? (Select the closest one to your duty title)

☐ DCS, Engineering and Services
☐ Chief, Environmental Management Division
☐ Chief, Environmental Management Section
☐ Environmental Engineer/Manager
☐ Other (please specify) _____.

2. To which major command do you belong?

<input type="checkbox"/> TAC	<input type="checkbox"/> MAC	<input type="checkbox"/> HQ USAF
<input type="checkbox"/> SAC	<input type="checkbox"/> ATC	
<input type="checkbox"/> AFLC	<input type="checkbox"/> AFSC	
<input type="checkbox"/> Space	<input type="checkbox"/> Other (please specify) _____.	

SECTION II.

The following questions refer to different "types" of environmental organizations. We have defined these types of organizations as: 1) Environmental Management Office (working directly for an installation, wing, or base commander), 2) Branch Level (DEV, working directly for the base civil engineer), or 3) Section Level (DEEV, working for the Chief, Engineering and Environmental Planning).

Instructions: Select only ONE response to each question. A "No" or "Unsure" response to some questions will require you to skip over several of the following questions which follow up on the same question, so please read each response carefully.

3. How many of your bases have changed types of environmental organization within the last two years? _____.

4. What would you describe as the primary reason for these changes?

- ☐ Increasing/decreasing (circle one) number of environmental problems at the base.
- ☐ Increasing number of environmental programs required by new environmental laws and regulations.
- ☐ An increasing/decreasing (circle one) emphasis from higher command levels.
- ☐ Reasons unknown to me.
- ☐ Other (please specify)_____.

5. How do you feel that these changes impacted the overall effectiveness of your command's base environmental organizations?

- ☐ Increased the overall effectiveness of the environmental organizations.
- ☐ Decreased the overall effectiveness of the environmental organizations.
- ☐ Did not change the overall effectiveness of the environmental organizations.
- ☐ Had mixed effects among the different bases.
- ☐ Do not know how it affected the overall effectiveness of the environmental organization.

6. How do you feel the Air Force should regulate the organizational structure of the environmental organization?

- ☐ Adopt a standard type of environmental organization at base level.
- ☐ Allow the major commands to decide on the type of environmental organization at base level.
- ☐ Allow the bases to decide on the type of environmental organization at base level.

7. Do you feel that, in general, one type of environmental organization is more effective than another?

- ☐ Yes ☐ No ☐ Unsure (If No or Unsure skip to question 11).

8. Which type of environmental organization do you feel is the most effective at base level?

- ☐ Environmental Management Office (working directly for an installation, wing, or base commander)
- ☐ Branch Level (DEV, working directly for the base civil engineer)
- ☐ Section Level (DEEV, working for the Chief, Engineering and Environmental Planning)
- ☐ Other (please describe)_____.

9. Why do you feel that this type of environmental organization is more effective than others (written comments please)?

10. If you were going to decide on the type of environmental organization to have at your command's bases which of these factors would you consider most important?

- The scope of the bases' environmental problems.
- The scope of the bases' environmental programs.
- The availability of resources (manpower, vehicles, etc.).
- Other factors (please describe):_____.

SECTION III.

Instructions: Please circle the number that corresponds to your response on the following questions.

11. Our bases' environmental organizations have adequate manpower to manage their environmental programs.

Strongly			Neither				
Disagree	Disagree	Slightly	Agree or	Slightly	Agree	Agree	Strongly
		Disagree	Disagree	Agree			
1	2	3	4	5	6	7	

12. Our bases' environmental organizations have adequate funding to manage their environmental programs.

Strongly			Neither				
Disagree	Disagree	Slightly	Agree or	Slightly	Agree	Agree	Strongly
		Disagree	Disagree	Agree			
1	2	3	4	5	6	7	

13. Our bases' environmental organizations have adequate resources (supplies, equipment and vehicles) to manage their environmental programs.

Strongly			Neither				
Disagree	Disagree	Slightly	Agree or	Slightly	Agree	Agree	Strongly
		Disagree	Disagree	Agree			
1	2	3	4	5	6	7	

14. Our bases' environmental organizations have adequate facilities to manage their environmental programs.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

15. Our bases' environmental organizations are successful at meeting their established goals.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

16. The personnel in our bases' environmental organizations are well educated in the environmental field.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

17. The personnel in our bases' environmental organizations are well experienced in the environmental field.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

18. Our bases' environmental organizations keep their bases and local communities well informed of environmental issues concerning their base.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

19. Our bases' environmental organization keeps their bases' environmental protection committee well informed of environmental issues affecting the base.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

20. Our bases' environmental organizations are up to date on current issues and technical advances in the environmental field.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

21. Our bases' environmental organizations have a good working relationship with regulatory agencies.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

22. Our bases' environmental organizations work well with other base agencies.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

23. Our bases' environmental organization keep their base in compliance with all environmental laws and regulations.

Strongly Disagree		Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

24. On a scale of 1 to 7, how would you rate the overall effectiveness of your bases' environmental organizations?

Poor	Marginal		Fair	Excellent	Outstanding	
1	2	3	4	5	6	7

Additional Comments

25. What do you feel would be the advantages or disadvantages of one type of environmental organization (environmental management office, branch or section level function) over the other types.

26. Other comments concerning environmental organizations.

27. Comments concerning this questionnaire.

Appendix B: Survey Mailing List

Base Listing

443 CSG/DE
Andrews AFB, DC 20331-5000

ADC/DEV
Arnold AFB, TN 37389-5000

2 CSG/DEV
Beale AFB, CA 95903-5000

6570 ABG/DEV
Brooks AFB, TX 78235-5000

27 CSG/DEEV
Cannon AFB, NM 88101-5000

93 CSG/DEEV
Castle AFB, CA 95342-5000

14 CES/BEC
Columbus AFB, MS 39701-5000

436 CSG/DE
Dover AFB, DE 19902-5000

97 CSG/DEEV
Eaker AFB, AR 72315-5000

3200 SPTW/DEV
Eglin AFB, FL 32542-5000

812 STSW/DEEV
Ellsworth AFB, SD 57706-5000

23 CSG/DEEV
England AFB, LA 71301-5000

1002 CES/DEEV
Falcon AFB, CO 80912-5000

3498 CES/BEC
Goodfellow AFB, TX 76908-5000

416 CSG/DEV
Griffiss AFB, NY 13441-5000

3245 ABG/DEV
Hanscom AFB, NH 01731-5000

1776 ABW/DE
Altus AFB, OK 73523-5346

814 CSG/DEV
Barksdale AFB, LA 71110-5000

67 CSG/DEEV
Bergstrom AFB, TX 78743-5000

1100 ABG/DE
Bolling AFB, DC 20332

7 CSG/DEEV
Carswell AFB, TX 76127-5000

437 CSG/DEEV
Charleston AFB, SC 29404

836 CSG/DEQ
Davis-Monthan AFB, AZ 85707

96 CSG/DEEV
Dyess AFB, TX 79607-5000

6500 ABW/DEV
Edwards AFB, CA 93523-5000

343 CSG/DE
Eielson AFB, AK 96702-5000

21 CSG/DE
Elmendorf AFB, AK 99506-5000

92 CSG/DEEV
Fairchild AFB, WA 99011

90 CSG/DEV
F. E. Warren AFB, 92001

842 CSG/DEEV
Grand Forks AFB, ND 58201

305 CSG/DEEV
Grissom AFB, IN 46970

15 ABW/DE
Hickam AFB, HI 96853-5000

OO-ALC/EM
 Hill AFB, UT 84056-5000

31 CSG/DEEV
 Homestead AFB, FL 33039-5000

3380 CES/BEC
 Kessler AFB, MS 39534-5000

1606 ABW/EM
 Kirtland AFB, NM 87115-5000

3700 CES/DEEV2
 Lackland AFB, TX 78236-5000

47 CES/BEC
 Laughlin AFB, TX 78843-5000

42 CSG/DEEV
 Loring AFB, ME 04750-5000

832 CSG/DEV
 Luke AFB, AZ 85309-5000

840 CSG/DEEV
 Malmstrom AFB, MT 59401-5000

3800 ABW/DE
 Maxwell AFB, AL 36112-5000

62 CSG/DE
 McChord AFB, WA 98438-5436

438 CSG/DE
 McGuire AFB, NJ 08641-5045

347 CSG/DEEV
 Moody AFB, GA 31699-5000

TFWC/EM
 Nellis AFB, NV 89191-5000

1040 CES/DEEV
 Patrick AFB, FL 32925-5000

317 CSG/DE
 Pope AFB, NC 28308-5045

64 CES/BEC
 Reese AFB, TX 79489-5000

833 CSG/DEV
 Holloman AFB, NM

834 CSG/DE
 Hurlburt AFB, FL 32544

SA-ALC/EM
 Kelly AFB, TX 78214-5000

410 CSG/DEEV
 K. I. Sawyer AFB, MI 49834

1 CSG/DEV
 Langley AFB, VA 23665

314 CSG/DE
 Little Rock AFB, AR 72099

3415 CES/BEC
 Lowry AFB, CO 80230-5000

56 CSG/DEEV
 MacDill AFB, FL 33608

22 CSG/DEV
 March AFB, CA 92508-5000

384 CSG/DEEV
 McConnell AFB, KS 67221

SM-ALC/EM
 McClellan AFB, CA 95652

857 CSG/DEEV
 Minot AFB, ND 58701-5000

366 CSG/DEQ
 Mt. Home AFB, ID 83658

55 CSG/DEEV
 Offutt AFB, NE 68113

1003 CES/DEEV
 Peterson AFB, CO 80914

12 CES/BEC
 Randolph AFB, TX 78150

WR-ALC/EM
 Robins AFB, GA 31098

375 CSG/DE
Scott AFB, IL 62225-5045

363 CSG/DEEV
Shaw AFB, SC 29152-5000

OC-ALC/EM
Tinker AFB, OK 73145-5000

325 CSG/DEEV
Tyndall AFB, FL 32403-5000

WSMC/ET
Vandenberg AFB, CL 93437

82 CSG/BEC
Williams AFB, AZ 85224-5045

4 CSG/DEEV
S. Johnson AFB, NC 27531

3750 CES/BEC
Sheppard AFB, TX 76311

60 CSG/DE
Travis AFB, CA 94525-5000

7625 CES/DE
USAF Academy, CO 80840

800 CSG/DEEV
Whiteman AFB, MO 65301

379 CSG/DEV
Wurtsmith AFB, MI 48753

Headquarters Listing by Major Command

HQ TAC/DEV
Langley AFB, VA 23665

HQ TAC/DEVN
Langley AFB, VA 23665

HQ TAC/DEVR
Langley AFB, VA 23665

HQ AF SPACE COMMAND/DE
Peterson AFB, CO 80914

HQ AF SPACE COMMAND/DEPV
Peterson AFB, CO 80914

HQ AF SPACE COMMAND/DEPVP
Peterson AFB, CO 80914

HQ MAC/LEE
Scott AFB, IL 62225

HQ MAC/LEER
Scott AFB, IL 62225

HQ AFSC/DE
Andrews AFB, DC 20334

HQ AFSC/DEVP
Andrews AFB, DC 20334

HQ TAC/DEV
Langley AFB, VA 23665

HQ TAC/DEVE
Langley AFB, VA 23665

HQ TAC/DE
Langley AFB, VA 23665

HQ AF SPACE COMMAND/DEP
Peterson AFB, CO 80914

HQ AF SPACE COMMAND/DEPVC
Peterson AFB, CO 80914

HQ AF SPACE COMMAND/DEPVN
Peterson AFB, CO 80914

HQ MAC/LEEV
Scott AFB, IL 62225

HQ AFSC/DEV
Andrews AFB, DC 20334

HQ AFSC/DEVR
Andrews AFB, DC 20334

HQ AFSC/DEVX
Andrews AFB, DC 20334

HQ SAC/DE
Offutt AFB, NE 68113

HQ SAC/DEVC
Offutt AFB, NE 68113

HQ SAC/DEVN
Offutt AFB, NE 68113

HQ ATC/DE
Randolph AFB, TX 78150

HQ ATC/DEEV
Randolph AFB, TX 78150

HQ USAF/CE
Bolling AFB, DC 20332

HQ USAF/CEVR
Bolling AFB, DC 20332

HQ USAF/CEVO
Bolling AFB, DC 20332

HQ USAF/CEVVP
Bolling AFB, DC 20332

HQ AFLC/DE
Wright-Patt AFB, OH 45433

HQ AFLC/DEVE
Wright-Patt AFB, OH 45433

HQ AFLC/DEVX
Wright-Patt AFB, OH 45433

HQ PACAF/DE
Hickam AFB, HI 96853

HQ PACAF/DEPV
Hickam AFB, HI 96853

HQ SAC/DEV
Offutt AFB, NE 68113

HQ SAC/DEVP
Offutt AFB, NE 68113

HQ ATC/DEE
Randolph AFB, TX 78150

HQ USAF/CEV
Bolling AFB, DC 20332

HQ USAF/CEVV
Bolling AFB, DC 20332

HQ USAF/CEVN
Bolling AFB, DC 20332

HQ AFLC/DEV
Wright-Patt AFB, OH 45433

HQ AFLC/DEVV
Wright-Patt AFB, OH 45433

HQ PACAF/DEP
Hickam AFB, HI 96853

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REPORT DOCUMENTATION PAGE			FORM APR 80 GPO 50-107-104	
1. AGENCY USE ONLY (Leave blank)				
2. REPORT DATE September 1991		3. REPORT TYPE AND DATES COVERED Master's Thesis		
4. TITLE AND SUBTITLE AN ANALYSIS OF BASE LEVEL ENVIRONMENTAL ORGANIZATIONS			5. FUNDING NUMBERS	
6. AUTHOR(S) John F. Akers Jr., Captain, USAF				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Institute of Technology, WPAFB OH 45433-6583			8. PERFORMING ORGANIZATION REPORT NUMBER AFIT/GEM/DEV/91S-1	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12. DISTRIBUTION AVAILABILITY STATEMENT Approved for public release; distribution unlimited			13. DISTRIBUTION STATEMENT	
14. ABSTRACT The purpose of this thesis was to determine the best design for base-level environmental organizations. Environmental management offices, and civil engineering branch and section level environmental organizations were considered. The study tried to determine the reasons why bases have changed their environmental organizations, and if the Air Force should develop a standard type of environmental organization. Determining if one environmental organization was more effective than the other types, and the factors that are important in determining the type of organization, were also examined. A literature review found two studies which addressed a portion of this subject. In this study, a survey was sent to 443 Air Force officers and civilians, who are involved in environmental management. The survey results did not reveal one specific reason why bases had changed the type of their environmental organization. The thesis concluded that the Air Force should not develop a standard type of environmental organization, but leave this decision up to the bases. In general, one type of environmental organization was not found to be more effective than another. The most important factors to use in determining type of environmental organization were summarized to provide guidance to decision makers.				
15. SUBJECT TERMS Environmental Management, Environmental Protection, Organization Theory, Organizations, Organizations (Military)			16. NUMBER OF PAGES 94	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

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